

REMARKS

By the present amendment product claims 1 to 4 and 10 are under consideration in the application. Claim 10 is an independent claim. Method claims 5 to 9 have been withdrawn from consideration due to the restriction requirement.

Support For Claim Amendments

Claim 1

In claim 1, the composition of the steel has been defined by the phrase -- consisting essentially of--. This is to reflect that Cu and Ni have been deleted from dependent claim 3. That is, the claims have been amended to exclude Cu and Ni from the steel of the steel sheet of the present amendment.

This is supported by invention steels A, B, C, F, K and L of Table 1 at page 22 of the specification which do not contain Cu and/or Ni in the steel composition of the invention steel.

Cited reference Japan No. 8-157957 requires Cu and Ni in its steel. Therefore, claim 1 has been amended to distinguish over Japan No. 8-157957 which was cited in the Office Action to reject the claims.

The equation in claim 1 has been changed from “ -12/14 N” to read -- + 12/14N-- to correct a typographical error.

Claim 2

In claim 2, the equation has been changed from “ -12/14N” to read -- +12/14N-- to correct a typographical error.

Claim 3

Claim 3 has been amended to delete Cu and Ni. See discussion of claim 1.

Claim 10

Claim 10 has been amended to make it dependent on claim 1 or 2.

The equation has also been amended to change “-12/14N” to read -- +12/14N-
- to correct a typographical error.

§103

Claims 1 to 4 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Japan No. 8-157957 (referred to in the Office Action as 408157957).

This rejection, as applied to the amended claims, is respectfully traversed.

Patentability

The technology disclosed in JP8-157957 (JP ‘957) relates to a high strength, hot rolled steel plate excellent in stretch flange workability, where the steel plate contains C: 0.02 - 0.10%, Si < 1.0%, Mn < 3.0%, P < 0.1%, S < 0.01%, Ti: 0.1 - 1.0% and satisfying $C < [(Ti - 3.43N - 1.5S)/4]$, equation (1) of [0011] of JP ‘957, and further contains Cu: 0.2 - 2.0% and Ni < 2.0% and satisfying $0.2 < Ni/Cu < 1.5$ and the balance Fe and unavoidable impurities. If Nb is added to the steel of JP ‘957, it must satisfy equation (2) of [0011].

A production process of the steel plate of JP ‘957 comprising the steps of: heating a slab containing above mentioned compositions, terminating hot rolling at a temperature of more than (Ar₃ - 50°C), cooling it to 400 - 750°C with a cooling rate of 30 - 100°C/sec, coiling it at 400 - 750°C for obtaining the microstructure partly or wholly bainitic ferrite, and a tensile strength of more than 600N/mm², and critical bore-expand ratio of more than 90%.

However, the hot-rolled steel sheet according to the present invention does not contain Cu and Ni as indispensable elements. Therefore, the present invention is a quite different type of steel sheet. Further, the present invention defined C* amount (solid solution C) represented by the equation:

$$0\% < C - \underline{(12/48Ti + 12/14N - 12/32S)} \geq 0.05\%.$$

Regarding this point, JP8-157957 clearly mentions that if the C content does not satisfy equation (1) or (2), solid solution C remains in the ferrite phase and forms a secondary phase in the ferrite phase and deteriorate flangiability [0011]. On the other hand, according to the present invention, C* amount (solid solution C) is defined as over 0% and up to 0.05% for softening resistance of the weld heat affected zone and ensuring hole expandability.

Further, JP8-157957 clearly mentions that even if the tensile strength of the steel plate with bainitic ferrite has a tensile strength more than 600N/mm², it does not deteriorate the hole-expandability ratio, and further discloses that bainite ferrite is formed by the addition of Cu, and it is necessary to add both of Cu and Ni to exhibit the desired effects.

On the other hand, the present invention does not contain Cu and/or Ni, but does exhibit tensile strength of more than 780N/mm² and a hole expandability ratio of 96% (Steel-K) to 110% (Steel C-1) of Table 2 of the specification, which is the same values as JP8-157957. Therefore, the present invention is very different from the technology disclosed in JP8-157957.


It is therefore submitted that amended independent claim 1, and all claims dependent thereon, are patentable over Japan No. 8-157957.

CONCLUSION

It is submitted that in view of the present amendment and foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application, as amended, be allowed and passed for issue.

Respectfully submitted,

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